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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
KAUSHAL, SUMESH	

ART UNIT	PAPER NUMBER
1636	

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/010,081	TRONO ET AL.	
	Examiner	Art Unit	
	Sumesh Kaushal	1636	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *21 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4-25,30-34 and 38-45* is/are pending in the application.

4a) Of the above claim(s) *11,13-18,20,21 and 24* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4-10,12,19,22,23,25,30-34 and 38-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Applicant's response filed on 02/14/05 has been acknowledged.

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn. The current office action is issued to correct the typographical that in erroneously omitted the rejection claim 29 as amended (now canceled) under the cited prior art of record.

Claims 1-3, 26-28 and 35-37 are canceled.

Claims 11, 13-18, 20-21 and 24 are withdrawn.

Claims 4-10, 2, 19, 22, 23, 25, 30-34 and 38-45 are examined.

Applicants are required to follow Amendment Practice under revised 37 CFR §1.121. The fax phone numbers for the organization where this application or proceeding is assigned is **703-872-9306**.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The references cited herein are of record in a prior Office action.

Election/Restrictions

Earlier applicant elected (*without traverse*) EF-Iα promoter, the woodchuck hepatitis virus posttranscriptional regulatory element (WPRE) and multi drug resistance gene in the reply filed on 03/31/04.

Claims 11, 13-18, 20-21 and 24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 03/31/04.

The restriction requirement is maintained, since claim 30 is not in condition of an allowance.

Double Patenting

Claims 4-10, 12, 19, 22-23, 25, 30-34 and 38-45 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 113-123 of copending Application No. 10/261,078. Although the conflicting claims are not identical, they are not patentably distinct from each other because the scope of transduced host cells and the method of transducing human hematopoietic stem cells as claimed in the 10/261,078 encompasses the host cells and method of transducing human hematopoietic stem cells as claimed in instant application

(10/010,081), for the same reasons of record as set forth in the office action mailed on 06/18/04

Specifically the scope of host cell of claims 113-115 of '078 is identical to the host cells (hematopoietic progenitor cells) of claims 4-10, 12, 19, 22-23, 25, 30-34 and 38-45 of instant application. In addition the scope of method of transducing human hematopoietic stem cells with a letiviral vector of claims 116-123 of '078 is identical to claims 32-34 and 38-45 of instant application. Thus the invention as claimed in the '078 and the instant application are obvious in view of each other.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to argument

The applicant argues that the instant application is in condition of an allowance while '078 is still pending. The double patenting rejection is maintained, since the instant application is not in condition of an allowance.

Claim Rejections - 35 USC § 103

Claims 4-8, 12, 25, 30-34 and 38-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zufferey et al (J. Virol. 72912):9873-9880, 1998 in view of Deisseroth (Clinical Cancer Research 5: 1607-1609, 1999).

Zufferey teaches self-inactivating HIV-1 based lentivirus vector (SIN) comprising the HIV-1 back bone containing HIV-1 gag, pol and rev genes (page 9873, abstract,

col.2 para.1; page 9874, col.1 paras 3-7). The cited art further teaches that the SIN vectors contains a 400-nucleotide deletion in the 3' LTR which renders the LTR inactive as compared to wild type LTR (page 9874, col.2 para.5, page 9875, table-1, page 9876, table-2, page 9877 table-3). The cited art further teaches that the SIN lentiviral vector comprises the CMV internal promoter, wherein the CMV promoter is inherently known to promote detectable transcription of a transgene in human hematopoietic progenitor cells upon transduction with a lentiviral vector (*see Case et al PNAS 96:2988-2993, 1999, ref. of record on PTO-1449*). In addition the cited art teaches transduction of human PBLs and human lymphocytic SupT1 cells using the SIN expression vector (page 9875, table-1; page 9878 fig-4). The cited art further teaches that inactivation of LTR provides higher signal to noise ratio which falls in the range of about 10 to about 200 (see page 9876 table 2).

Even though Zufferey teaches transduction of human PBLs the cited art does not teach the transduction of hematopoietic stem cell comprising a self-inactivating SIN-lentiviral vector wherein the transgene is a multidrug resistance gene (MDR).

Deisseroth teaches clinical trails involving multidrug resistance transcription units encoded in retroviral vectors. The cited art teaches the use of retroviral vectors to transfer human MDR-1 into human hematopiotic stem cells in-vitro (page 1607, col. 1 para 4; col. 2 para.2). The cited art further teaches clinical trials, which show engraftment of vector modified clonogenic hematopoietic progenitor cells into human patients (page 1608, col.1). The cited art further teaches the use of lentiviral vectors to transduce early hematopoietic stem cells, which resulted in the transduction of at least

80% of CD34+/CD38- hematopoietic stem cells (page 1608, col.2 para.d). In addition the cited art teaches o of clonal analysis (differentiation) of CD34+ CD38- transduced cells cultured in LTBMC culture media for long-term cultures (page 2889, col.2 para.5-6, page 2991, fig-3, page 2992 col.1).

Thus it would have been obvious to one ordinary skill in the art at the time of filing to modify the invention of Zufferey by substituting the GFP reporter gene with a MDR gene and hematopoietic cells with hematopoietic stem cells in view of Deisseroth. It would have been further obvious to differentiate the transduced stem cell into different lineages, since hematopoietic stem cells have clonogenic potential. One would have been motivated to do so, since the transduction of human hematopoietic progenitor cells with the MDR-gene decrease the toxicity of chemotherapeutic agents in hematopoietic cells and differentiated cells. One would have a reasonable expectation of success in doing so, since retrovirus induced transduction of human progenitor cells (to express a gene of interest) has been routine in the art at the time of instant invention. Thus the invention as claimed is *prima facie* obvious in view of cited prior art of record.

Response to arguments

The applicant argues that there is no motivation to combine the teachings of Deisseroth with those of Zufferey. The applicant argues that there was no reasonable expectation that the SIN design would work in hematopoietic progenitor cells. The applicant argues that the behavior of an internal promoter with respect to LTR in SIN vector could not be predicted in advance. The applicant concluded that without having a reasonable expectation that a SIN vector could be successfully employed in

hematopoietic progenitor cells, there would be no reason or basis for the modification of SIN-vector. The applicant argues that the applicability of SIN-design vector to hematopoietic progenitor cells and is also silent as to any drawback associated with the CMV-promoter in this or any context (response page 9).

However, applicant's argumetns are found NOT persuasive. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). The rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law (See MPEP 2144). In this case, the combined teaching of Zufferey who teaches transduction of hematopoietic cells with a SIN-retroviral vector and Deisseroth who teaches transduction of hematopoietic stem cells with a retroviral vector clearly provides motivation to transduce hematopoietic stem cells with a SIN-retroviral vectors. Further applicant arguments taken as a whole rely heavily on the deficiencies of each reference taken alone. One cannot show non-obviousness by attacking references individually where the rejections are based on

combinations of references. *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In addition there is a reasonable expectation of success to use SIN-retroviral vector to transduce hematopoietic stem cell, since retroviral mediated transduction of human progenitor cells (to express a gene of interest) has been routine in the art at the time of instant invention

Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zufferey et al (J. Virol. 72912):9873-9880, 1998, ref. of record on PTO-1449) and Deisseroth (Clinical Cancer Research 5: 1607-1609, 1999) as applied to claims 4-8, 12, 25, 30-34 and 38-45 above, and further in view of Chang et al (Gene Therapy 6;715-728, 1999).

As stated above the combined teaching of Zufferey and Deisseroth teaches transduciton of a human hematopoietic stem cell using self-inactivating HIV-1 based lentivirus vector (SIN). Even though Zufferey and Deisseroth teaches a hematopoietic stem cell transduced with self-inactivating HIV-1 based lentivirus vector, the cited art dose not teach a lentiviral vector, wherein the EF-1α promoter directs the expression of a transgene.

Regarding claims 9-10 specifically, Chang teaches a HIV-1 derived vector system comprising pTVΔEFGPF genetic construct, which comprises human eleongation factor 1α promoter (page 126, col.1 para.1, line 21-26). The cited art further teaches the transduction of human CD34+ hematopoietic stem cells using pTVΔEFGPF lentiviral

vector, wherein the transduced progenitor cells express the GFP transgene under the control of the human eleongation factor 1α promoter (page 718. col.2 para. 2; pager 723, fig-5). Regarding claims 6-8 the cited art teaches that human hematopoietic progenitor cells express the the GFP transgene expression under the control of an EF-1α promoter, wherein the signal to noise ratio of the expressed GFP falls with the range of about 10 and about 200 (page 723, fig-5 see inset a-d). The cited art disclose that the phase contrast microscopy reveled that the strength of GFP signal is significantly higher than the untransduced colony (inset-a, lower colony). Such a contrast certainly fall in the range of signal to noise ratio as claimed (between about 10 and about 200). The signal to noise ratio is an arbitrary value that not only depends upon the strength of transgene signal by is also a function of instrument sensitivity and settings. Therefore the cited art clearly teaches that the EF-1α promoter provides transgene expression with higher signal to noise ratio in human hematopoietic progenitor cells. In addition, the cited art clearly anticipate the invention as claimed because the composition and functions as claimed are presumed inherent. The composition is physically the same it must have the same properties. "Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990) see MPEP § 2112.02.

Thus it would have been obvious to one ordinary skill in the art at the time of filing to modify the self-inactivating HIV-1 based lentivirus vector of Zufferey by

substituting the CMV promoter with human elongation factor 1α promoter for the transduction of human hematopoietic stem cells. One would have been motivated to do so because the EF-1α promoter is strong promoter to regulate the expression of a transgene in primary CD34+ hematopoietic stem cells. One would have a reasonable expectation of success of success in doing so, since substituting a promoter sequence with another and transduction of hematopoietic stem cells using a lentiviral vector has been routine in art at time of instant invention. Thus the invention as claimed is *prima facie* obvious in view of cited prior art of record.

Claims 19, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zufferey et al (J. Virol. 72912):9873-9880, 1998, ref. of record on PTO-1449) and Deisseroth (Clinical Cancer Research 5: 1607-1609, 1999) as applied to claims 4-8, 12, 25, 30-34 and 38-45 above, and further in view of Zufferey et al (J. Virol. 73(4):2886-2892, 1999, ref. of record on PTO-1449).

As stated above the combined teaching of Zufferey and Deisseroth teaches transduciton of a human hematopoietic stem cell using self-inactivating HIV-1 based lentivirus vector (SIN). However Zufferey-1998 does not teach a SIN vector comprising the virus posttranscriptional regulatory element that promotes the expression of a transgene, wherein the posttranscriptional regulatory element is woodchuck hepatitis virus posttranscriptional regulatory element (WPRE).

Zufferey-1999 teaches a HIV-1 based retroviral vector (pHR' CMV-GFP) that contains woodchuck hepatitis virus posttranscriptional regulatory element (WPRE). see page 2887 fig-1A, col.2 para. 2). The cited art further teaches that WPRE enhances the expression of a transgene in host cells transduced by the HIV-based vectors (page 2888, fig-2, col.2 results).

Thus it would have been obvious to one ordinary skill in the art at the time of filing to modify the invention of Zefferey-1998 by incorporating posttranscriptional regulatory element obtained from woodchuck hepatitis virus posttranscriptional regulatory element (WPRE) in view of Zufferey-1999. One would have been motivated to do so to increase the levels of expression of a transgene in host cells. One would have a reasonable expectation of success in doing so, since genetic modification of lentiviral vectors has been routine in the art at time the instant invention was made. Thus the invention as claimed is *prima facie* obvious in view of cited prior art of record.

Claims 6-8 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 6-8 are indefinite because instant claim recites claim limitation "about" to describe the signal-to-noise ratio (i.e. between about 10 and about 200). "About" means *reasonably close or in the vicinity.* Since "about" does not defines the exact starting position of the value as claimed, the terminology does point out the subject

matter which applicant regards as the invention. For example it is unclear whether the value of signal-to-noise ratio of 10 is excluded or included in this context.

Response to arguments

The applicant argues (in response filed on 9/21/04) that according to MPEP 2173.05(b) and particularly the section labeled "About" the invention as claimed is not indefinite

However, applicant's argument are found NOT persuasive because the court held that claims reciting "at least **about**" were invalid for indefiniteness where there was close prior art and there was nothing in the specification, prosecution history, or the prior art to provide any indication as to what range of specific activity is covered by the term "about." Amgen, Inc. v. Chugai Pharmaceutical Co., 927 F.2d 1200, 18 USPQ2d 1016 (Fed. Cir. 1991). In addition the phrases "relatively shallow," "of the order of," "the order of **about** 5mm," and "substantial portion" were held to be indefinite because the specification lacked some standard for measuring the degree intended and, therefore, properly rejected as indefinite under 35 U.S.C. 112, second paragraph. Ex parte Oetiker, 23 USPQ2d 1641 (Bd. Pat.App. & Inter. 1992). Similarly in the instant case the value as claimed is a ratio. The specification as filed lacks a standard for measuring the degree intended, therefore instant claims are properly rejected as indefinite.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sumesh Kaushal whose telephone number is 571-272-0769. The examiner can normally be reached on Mon-Fri. from 9AM-5PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yucel Irem Ph.D. can be reached on 571-272-0781.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to **571-272-0547.** For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300.**

Sumesh Kaushal
Examiner GAU 1636

SUMESH KAUSHAL
PATENT EXAMINER